



Device Information

| | |
|-------------|-----------|
| Model Name | VCXG-204C |
| Vendor Name | Baumer |

Sensor Information

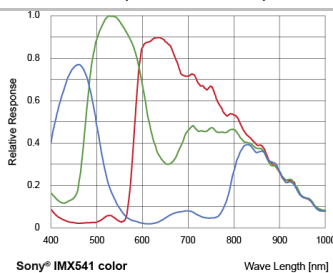
| | |
|-------------|----------------------------|
| Sensor Name | Sony IMX541 Gen4 |
| Type | 1.1" progressive scan CMOS |
| Shutter | Global Shutter |
| Resolution | 4480 x 4496 pixels |
| Scan Area | 12.27 mm x 12.31 mm |
| Pixel Size | 2.74 μm x 2.74 μm |

Data Quality

@ 20 °C, gain = 1, exposure time = 4 msec

| | |
|---------------------------|--|
| Dark Noise (σ) | 2.3 e- typical |
| Saturation | 9000 e- typical |
| Dynamic Range | 70 dB typical |
| SNR | 40 dB typical |
| Quantum efficiency η | 45% @ 465 nm, 52% @ 536 nm, 41% @ 631 nm typical |

Sensor Graph: Relative Response



Acquisition

| | | | |
|---|-------------------|-------------|---|
| Resolution | 4480 px x 4496 px | | |
| Interface Frame Rate (depends on used interface performance) | Format | Resolution | max. Frame Rate (@ Trigger Mode) ²⁾ |
| | Full Frame | 4480 x 4496 | 6 fps |
| | Binning 2x2 | 2240 x 2248 | 6 fps |
| | Binning 2x1 | 2240 x 4496 | 6 fps |
| | Binning 1x2 | 4480 x 2248 | 6 fps |

| | |
|--|---|
| Acquisition Frame Rate ¹⁾ (Burst Mode) | 6 fps $t_{\text{readout}} = 145$ msec (max. Res. Full Frame) @ 10 bit |
| | 6 fps $t_{\text{readout}} = 145$ msec (max. Res. Full Frame) @ 12 bit |

| | |
|---------------|--|
| Pixel Formats | BayerRG8, BayerRG10, BayerRG12, BayerRG12p Mono8, Mono10, Mono12, Mono12p, RGB8, BGR8 |
|---------------|--|

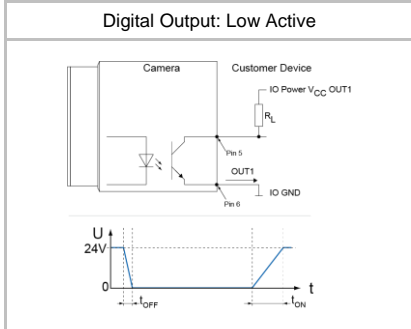
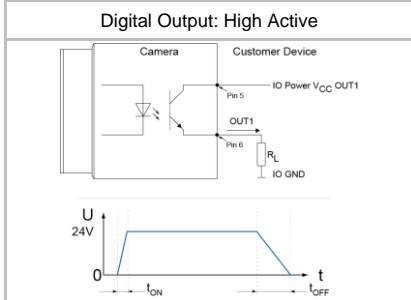
| | |
|-----------------------------------|--|
| Partial Scan | True Partial Scan with increasing Frame Rate on Y direction, Region of Interest (ROI) arbitrary Width: minimum 32, increment 32 Height: minimum 2, increment 2 |
| Adjustable Acquisition Frame Rate | Off or 0.01 ... 65535 Hz |

| | |
|--------------------|--|
| Acquisition Mode | Continuous, Single Frame and Multi Frame |
| Acquisition Status | AcquisitionActive, AcquisitionTrigger Wait |
| Exposure Mode | Timed |
| Readout Mode | Overlapped, Sequential |

Image Pre-Processing

| | |
|-----------------|--|
| Analog Controls | Exposure Time (1 μsec ... 60 sec Step Size 1 μsec) Gain (0...48 dB), Offset (0 ... 255 LSB 12 bit) |
| Auto Function | ExposureAuto and GainAuto with BrightnessAutoPriority based on BrightnessAuto ROI BalanceWhiteAuto and ColorTransformationAuto based on BalanceWhiteAuto ROI |

| | |
|------------------|--|
| LUT | Luminance (12 bit) |
| Color Models | Mono, Raw Bayer, RGB and BGR |
| Color Processing | Integrated color processor for high quality color calculation |
| Color Adjustment | Manual White Balance Automatic White Balance (Once or Continuous) based on Region of Interest (ROI) |



¹⁾ Sensor readout, different from pixel format

²⁾ depends on the used interface

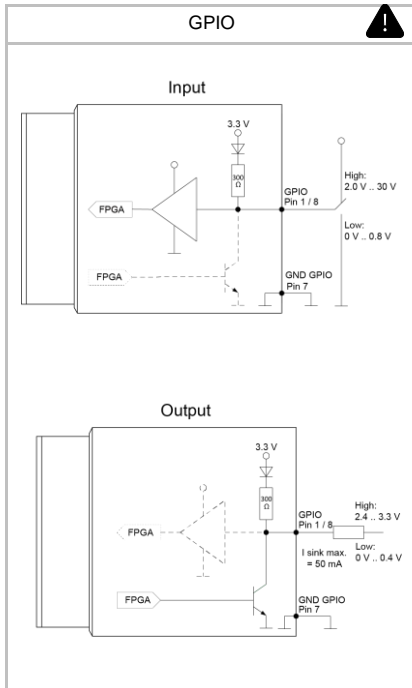
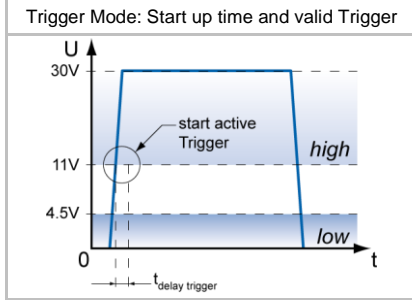
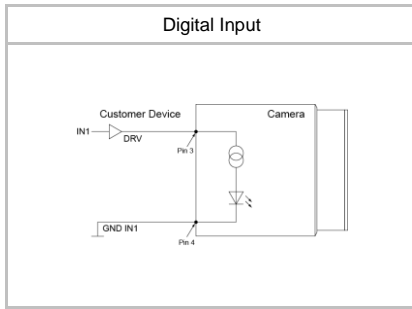


Image Pre-Processing

| | |
|------------------------------|--|
| Color Enhancement | Color Transformation to sRGB color space by optimized Matrix for 3000 K, 5000 K, 6500 K and 9500 K Lightsource or User defined Matrix |
| Color Tolerance | - |
| Binning Horizontal | 1 or 2 |
| Binning Vertical | 1 or 2 |
| Defect Pixel Correction | via Defect Pixel List with up to 512 Pixel Coordinates |
| Image Flipping | Horizontal, vertical |
| Fix Pattern Noise Correction | - |

Process Synchronization

| | |
|----------------------|--|
| Trigger Mode | Off (Free Running), On (Trigger) |
| Trigger Overlap Type | Readout |
| Trigger Sources | Hardware (Line0, 1, 2), Software, Counter 1, 2 End, Action CMD (Action 1), All or Off fixed Trigger Delay out of t_readout: ¹⁾ 295 µsec @ 12 bit max. Trigger Delay during t_readout: ¹⁾ 295 µsec @ 12 bit |
| Trigger Delay | 0 ... 2 sec, Tracking and buffering of up to 256 triggers |
| External Flash Sync | via Exposure Active t_delay flash ≤ 3 µsec, t_duration = t_exposure |
| Encoder Function | yes, via Counter and Trigger Source |
| PTP Function | - |

Digital I/Os

| | |
|----------------|--|
| Lines | Input: Line 0, Output: Line3, GPIO: Line 1, Line 2 |
| Output Sources | Off, ExposureActive, Timer1, ReadoutActive, UserOutput 1-3 and TriggerReady |
| Line Debouncer | Low and high signal separately selectable Debouncing Time 0 ... 5 msec, Step Size: 1 µsec |

Memory

| | |
|---------------------|---|
| Image Buffer | 231 MB 4 Images (Trigger Mode) / 1 Image (Free Running Mode) |
| Non-volatile Memory | 128 kb |

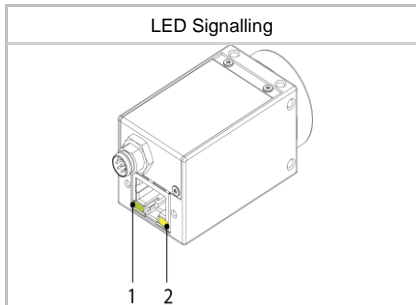
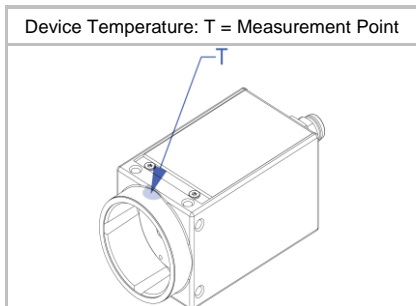
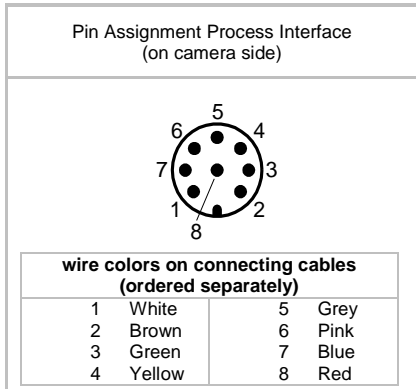
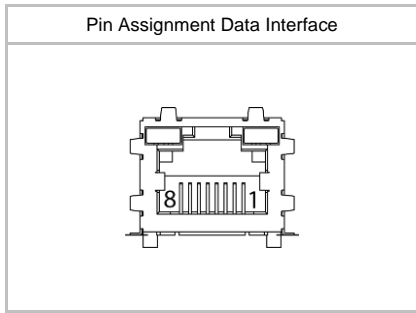
Network Interface Data

| | |
|---------------------------|--|
| Interface | Gigabit Ethernet 1000BASE-T 1000 Mb/s/sec Fast Ethernet 100 BASE-T 100 Mb/s/sec |
| Ethernet IP Configuration | Persistent IP, DHCP, LLA |
| Packet Size | 576 ... 9000 Byte, Jumbo Frames supported |

GigE Vision® Features

| | |
|---|---|
| Events | DeviceTemperatureStatusChanged, EventLost, ExposureEnd, ExposureStart, FrameEnd, FrameStart, FrameTransferSkipped, GigE VisionError, GigE VisionHeartbeatTimeOut, PrimaryApplicationSwitch, Line0..2 FallingEdge, Line0..2 RisingEdge, TransferBufferFull, TransferBufferReady, TriggerOverlapped, TriggerReady, TriggerSkipped |
| Transmission via Asynchronous Message Channel | |
| Action CMD | yes, Action 1 for Trigger |
| Frame Counter | up to 2 ³² |
| Payload Size | 0 ... 60426464 Byte |
| Timestamp | 64 bit, resolution in nsec, increment = 8 |
| Packet Delay | 0 ... 2 ³² - 1 nsec |
| Packet Resend | Resend Buffer: 231 MB (4 Images) |
| GigE Vision | v2.0 |

¹⁾ Sensor readout, different from pixel format



Interfaces and Connectors

| | | | |
|--------------------------|-----------------------|---|----------------|
| Data and Power Interface | Gigabit Ethernet | Transfer Rate | 1000 Mbits/sec |
| | Fast Ethernet | Transfer Rate | 100 Mbits/sec |
| | Connector: | 8P8C Modular Jack (RJ45), screw lock type | |
| Process Interface | Assignment: | 1 - MX1+ | 2 - MX1- |
| | | 3 - MX2+ | 4 - MX3+ |
| | | 5 - MX3- | 6 - MX2- |
| | | 7 - MX4+ | 8 - MX4- |
| | Connector: | M8/8-pin (SACC-DSI-M8MS-8CON-M8-L180) | |
| | Assignment: | 1 - GPIO (Line2) | 2 - Power Vcc |
| | 3 - IN1 (Line0) | 4 - GND IN1 | |
| | 5 - Power VCC OUT | 6 - OUT1 (Line3) | |
| | 7 - GND (Power, GPIO) | 8 - GPIO (Line1) | |

Caution * Note GPIOs: Ground loops are to be avoided and can lead to destruction of the device.

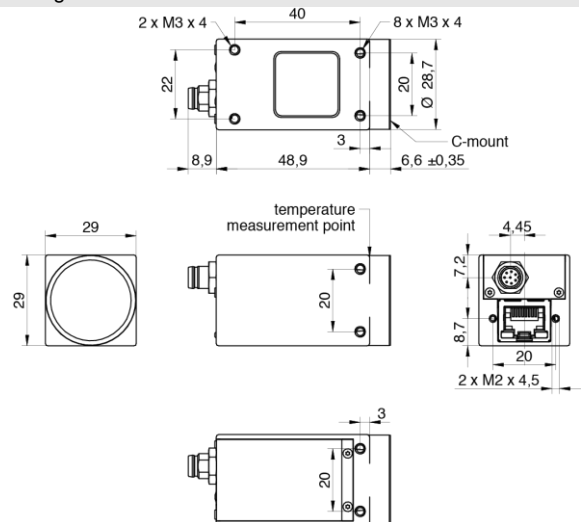
Optical Data

| | |
|----------------|---------------|
| Lens Mount | C-Mount |
| Optical Filter | IR cut filter |

Mechanical Data

| | |
|------------------|---|
| Housing | Zinc die casting, baked varnish |
| Protection Class | IP40 (with mounted lens and GigE cable) |
| Weight | 120 g |

Dimensions



| | |
|-------------------------|----|
| Additional Cooling Pipe | no |
|-------------------------|----|

Environmental Data


| | |
|-------------------------|---|
| Storage Temperature | -10 °C ... + 70 °C |
| Operating Temperature | 0 °C ... +65 °C @ T = Measurement Point or 0 °C ... +75 °C @ internal Temperature Sensor *) |
| | Note: Ambient temperature above 30 °C requires heat dissipation measures. |
| Int. Temperature Sensor | yes, accuracy: ±2 °C (typ) -40 °C ... 0 °C ±1 °C (typ) 0 °C ... +85 °C |
| Humidity | 10 % ... 90 % non-condensing |

*) the maximum temperature for Sony sensor characteristics (sensor performance) are guaranteed up to 50 °C @ Measurement Point or up to 60 °C @ internal temperature sensor

LED Signalling

| | | | |
|-----|-------|---------------|-----------|
| LED | LED 1 | Green static | Link ON |
| | | Green flash | RX active |
| | LED 2 | Yellow static | Error |
| | | Yellow flash | TX active |

Electrical Data

| | |
|----------------------|---|
| Power Supply (ext.) | VCC: 12 ... 24 V DC \pm 20% I: 125 ... 250 mA |
| Power over Ethernet | Class 1 device VCC: 36 ... 57 V DC I: 78 mA @ 48 VDC |
| Power Consumption | approx. 3.0 W @ 12VDC and 6 fps approx. 3.7 W @ 48 VDC (PoE) and 6 fps (Factory Setting "Default") |
| Digital Input | Optocoupler $U_{IN(low)}$: 0.0 ... 4.5 VDC $U_{IN(high)}$: 11.0 ... 30.0 VDC I_{IN} : 3.0 ... 10.0 mA min. Impulse Length: 2.0 μ sec |
| Digital Output | Optocoupler U_{EXT} : 5 ... 30 V DC I_{OUT} : max. 50 mA t_{ON} = typ. 3 μ sec t_{OFF} = typ. 40 μ sec |
| GPIO | direct, without optocoupler |
| GPIO used as Input: | $U_{IN(low)}$: 0.0 ... 0.8 VDC $U_{IN(high)}$: 2.0 ... 30.0 VDC min. Impulse Length: 2.0 μ sec |
| GPIO used as Output: | $U_{Out(low)}$: 0.0 ... 0.4 VDC ($I_{sink\ max}$: 50 mA) $U_{Out(high)}$: 2.4 ... 3.3VDC (I_{max} : 1 mA) |
| Caution |  * The General Purpose I/Os (GPIOs) are not potential-free and do not have an overrun cut-off. Incorrect wiring (overvoltage, undervoltage or voltage reversal) can lead to defects in the electronic system. Ground loops are to be avoided and can lead to destruction of the device. |

Conformity

| | |
|----------------------------|--|
| Conformity | CE, RoHS, REACH |
| KC Registration No. / Date | - / - |
| MTBF | 53 years @ T = 45 °C / 34 years @ T = 60 °C T = Measurement Point |

GenICam™ Features

| | |
|----------------------|---|
| Short Exposure Range | yes, ShortExposureTimeEnable Short Exposure Range 1 ... 3 μ sec - 34 μ sec ... 60 sec Default Exposure Range 34 μ sec ... 60 sec |
| Timer | Timer Selector: Timer 1 TimerTriggerSource: Line0, SoftwareTrigger, ExposureStart, ExposureEnd, FrameTransferSkipped, TriggerSkipped, Action 1 and Off TimerDelay: 0 μ sec ... 2 sec, Step Size: 1 μ sec TimerDuration: 4 μ sec ... 2 sec, Step Size: 1 μ sec |
| Counter | Counter Selector: Counter 1, Counter 2 CounterValue: 0 ... 65535 Counter Event Source: Counter1End or Counter2End, ExposureActive, FrameTransferSkipped, FrameTrigger, TriggerSkipped, Line0..2 and Off Counter Reset Source: Counter1End, Counter2End, Line0..2 and Off |
| Sequencer | Sequencer Characteristics: up to 128 sets, up to 4 possible pathes for triggered set transitions, 6 trigger sources: Counter1End, Counter2End, ExposureActive, Line0..2, ReadoutActive, Timer1End Sequencer Parameters for Exposure, Gain, Trigger, ROI and Output: ExposureTime, CounterDuration, CounterEventActivation, CounterEventSource, CounterResetSource, ExposureMode, ExposureTime, Gain, Height, OffsetX, OffsetY, TriggerMode, UserOutputValue, UserOutputValueAll, Width |

GenICam™ Features

| | |
|------------------------------|--|
| User Sets | Factory Settings: UserSet0 (read only) Freely Programmable: UserSet1, UserSet2, UserSet3 Parameters: any user definable Parameter |
| Acquisition Abort | Delay up to 145 msec |
| Chunk Data | yes, Chunk Selector: Binning, BlackLevel, CounterValue, DeviceTemperature, ExposureTime, FrameID, Gain, Height, Image, ImageControl, LineStatusAll, OffsetX, OffsetY, PixelFormat, SequencerSetActive, Timestamp, Width |
| Device Temperature | InHouse Event generation for Normal to High, High to Exceeded and Exceeded to Normal Exceeded (no image transfer) = max. internal temperature sensor + 1 °C |
| Device Link Throughput Limit | yes, up to max. Device Link Speed |
| Custom Data | yes, 128 Byte with CustomDataKonfiguration Mode |
| SFNC Version | v2.4 |

Factory Settings after Start-Up

| | |
|--------------------------------|--|
| Ethernet IP Configuration | |
| Trigger Mode | Off (Free Running) |
| Analog Controls | Exposure Time: 4 msec, Gain: 0 dB, Offset: 0 |
| Pixel Format | BayerRG8 |
| Partial Scan | Off |
| Acquisition Frame Rate | Off |
| Timer/Counter/Sequencer | Off |
| Defect Pixel Correction | ON |
| Fixed Pattern Noise Correction | - |
| Digital Input | Line0, invert = false |
| Digital Output | Line3, invert = false, line source = Off |
| GPIO 1/2 | Line1, Line2, invert = false, LineMode = Input |
| TriggerSource | All |

Partial Scan @ FullFrame, min Exposure, Mono8 (monochrome camera) or BayerRG8 (color camera)

| | Resolution | max. fps acquisition | max. fps interface ²⁾ |
|----------|-------------|----------------------|----------------------------------|
| HXGA | 4096 x 3072 | 9 | 9 |
| UHD (4K) | 3840 x 2160 | 13 | 13 |
| Full HD | 1920 x 1080 | 26 | 26 |
| SXGA | 1280 x 1024 | 27 | 27 |
| HD720 | 1280 x 720 | 38 | 38 |
| XGA | 1024 x 768 | 36 | 36 |
| SVGA | 800 x 600 | 44 | 44 |
| VGA | 640 x 480 | 53 | 53 |
| CIF | 352 x 288 | 79 | 79 |
| QVGA | 320 x 240 | 89 | 89 |
| QCIF | 176 x 144 | 123 | 123 |
| LineScan | 4480 x 4096 | 7 | 6 |
| | 4480 x 2048 | 14 | 13 |
| | 4480 x 1024 | 27 | 26 |
| | 4480 x 512 | 50 | 50 |
| | 4480 x 256 | 85 | 85 |
| | 4480 x 128 | 131 | 131 |
| | 4480 x 64 | 178 | 178 |
| | 4480 x 32 | 217 | 217 |
| | 4480 x 16 | 244 | 244 |
| | 4480 x 8 | 260 | 260 |
| | 4480 x 4 | 260 | 260 |
| | 4480 x 2 | 260 | 260 |
| | 4480 x 1 | - | - |

²⁾ depends on the used interface